

Sport Concussion Updates:

Engaging research to improve prevention & clinical care

Johna K. Register-Mihalik, PhD, LAT, ATC

Asst. Professor

Department of Exercise and Sport Science

Kevin Guskiewicz, PhD, ATC

Kenan Distinguished Professor

Department of Exercise and Sport Science

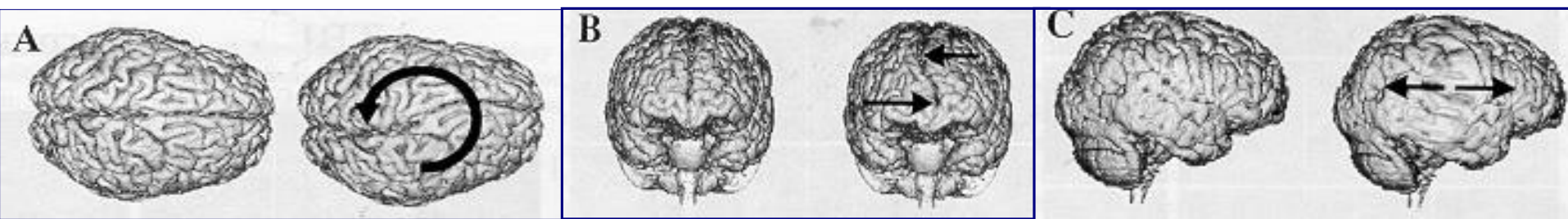
Dean, College of Arts and Sciences



UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

Injury Definition: Sports Concussion

- “Concussion *is a traumatic brain injury* induced by biomechanical forces. Several common features that may be utilized in defining the nature of a concussive head injury include...”



Definition

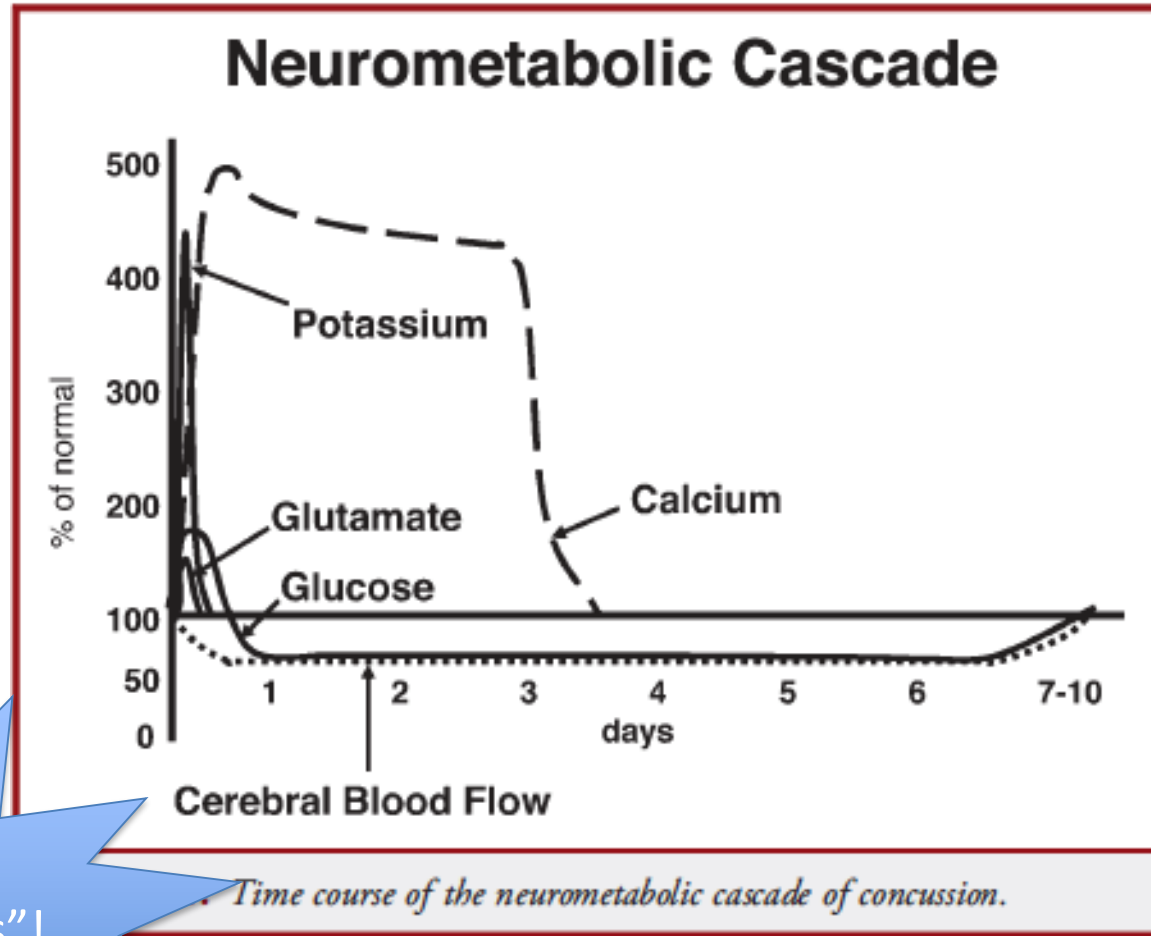
1. Concussion may be caused either by a direct blow to the head, face, neck or elsewhere on the body with an “impulsive” force transmitted to the head.
2. Concussion typically results in the rapid onset of short- lived impairment of neurologic function that resolves spontaneously. *However in some cases symptoms and signs may evolve over a number of minutes to hours.*
3. Concussion may result in neuropathological changes but the acute clinical signs and symptoms largely reflect a functional disturbance rather than a structural injury *and as such, no abnormality is seen on standard structural neuroimaging studies.*
4. Concussion results in range of clinical signs and symptoms that may or may not involve loss of consciousness. Resolution of the clinical and cognitive symptoms typically follows a sequential course. However it is important to note that in *some* cases, may be prolonged

The clinical signs and symptoms cannot be explained by drug, alcohol or medication use, other injuries (such as cervical injuries, peripheral vestibular dysfunction, etc) or other comorbidities (eg psychological factors or coexisting medical conditions)

The New Neurometabolic Cascade of Concussion

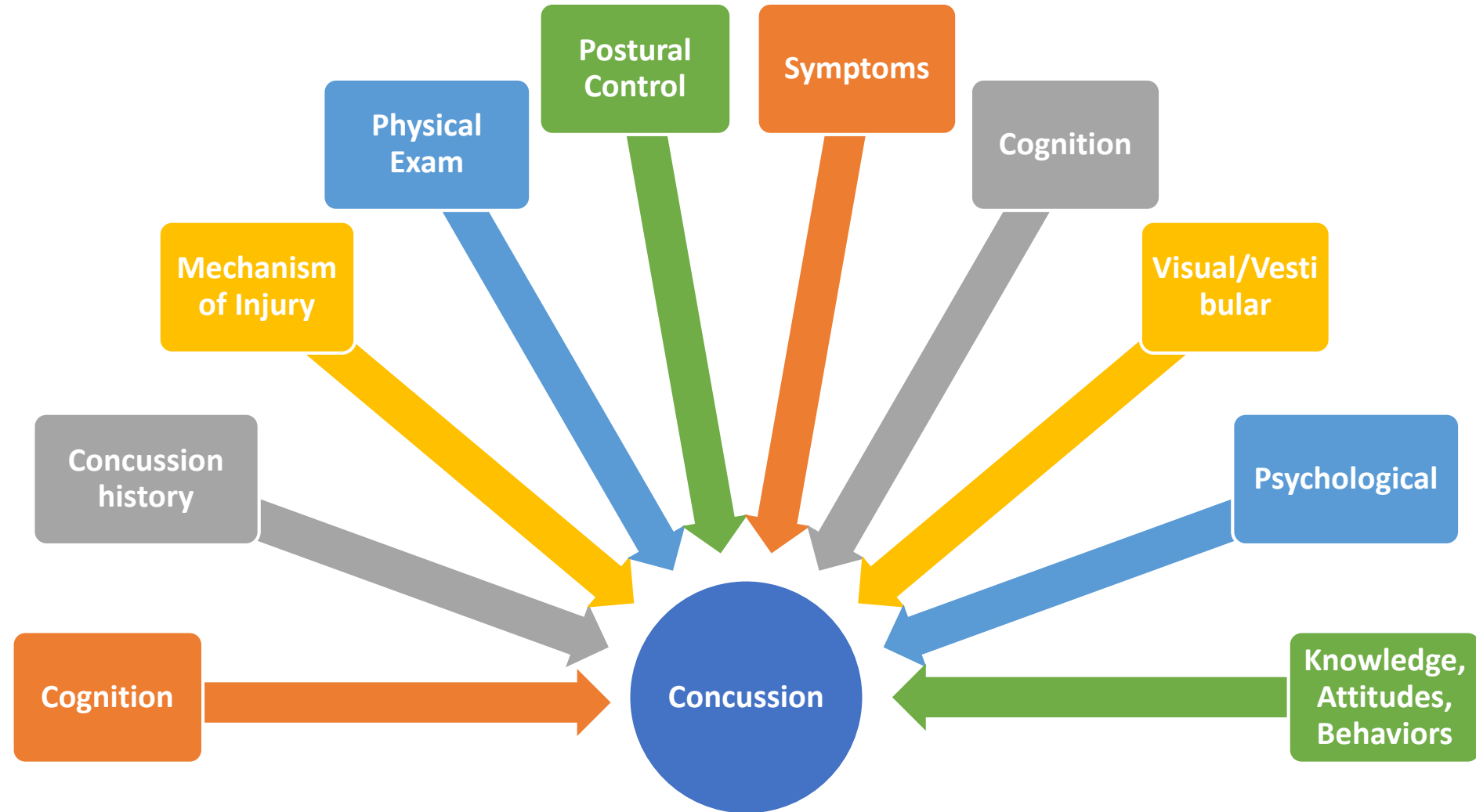
Christopher C. Giza, MD*‡§

David A. Hovda, PhD‡§¶



“Energy Crisis”!

Concussion: A Multifaceted Condition



Potential Issues with Mismanagement

Short Term Issues

Worsening of post-concussive signs and symptoms

Repeat concussion with post concussion syndrome

School-related issues in student athletes

Second Impact Syndrome (younger athletes)

Long Term Issues

Prolonged concussion symptoms (daily basis)

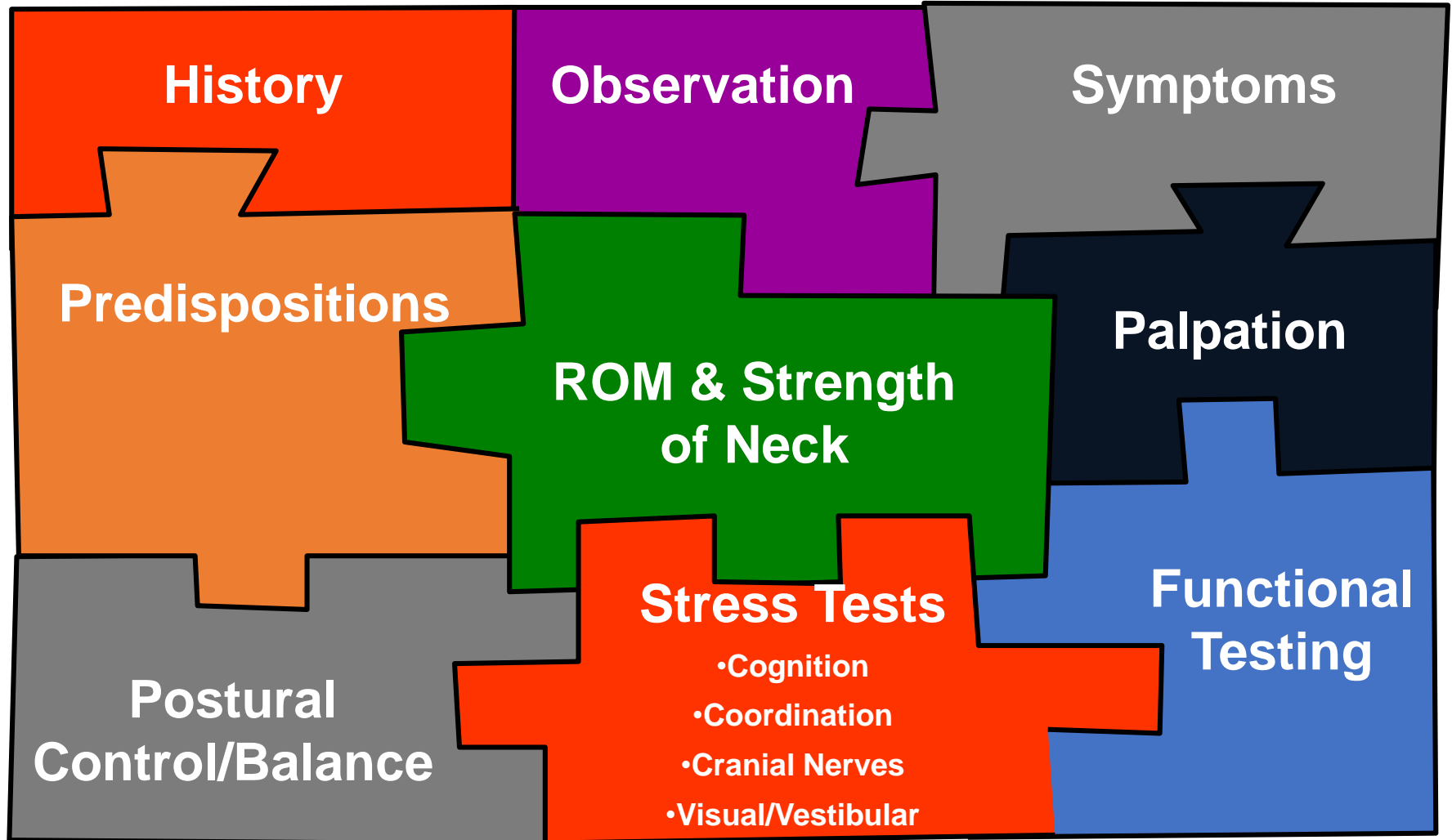
Depression, cognitive impairment, dementia

Long-term academic issues in student athletes

Decreased Quality of Life

Multimodal Assessment Paradigm

(Broglia, 2008; Register-Mihalik 2011 & 2012)



Slide courtesy of Dr. Scott Bruce

Return to Sport Progression

Symptom Limited Activity

Light Aerobic Activity

Sport Specific Exercise

Non-Contact Training

Full Contact Training

Return to Sport / Full Contact Return to Play

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position statement

National Athletic Trainers' Association Position Statement: Management of Sport Concussion

Steven P. Broglio, PhD, ATC*; Robert C. Cantu, MD†; Gerard A. Gioia, PhD‡; Kevin M. Guskiewicz, PhD, ATC, FNATA, FACSMS§; Jeffrey Kutcher, MD*; Michael Palm, MBA, ATC||; Tamara C. Valovich McLeod, PhD, ATC, FNATA¶

*University of Michigan, Ann Arbor; †Department of Surgery, Emerson Hospital, Concord, MA; ‡Division of Pediatric Neuropsychology, Children's National Medical Center, Washington, DC; §Department of Exercise and Sport Science, University of North Carolina, Chapel Hill; ||Athletico Physical Therapy, Oak Brook, IL; ¶Athletic Training Program, A.T. Still University, Mesa, AZ

Objective: To provide athletic trainers, physicians, and other health care professionals with best-practice guidelines for

Recommendations: The recommendations for concussion management provided here are based on the most current

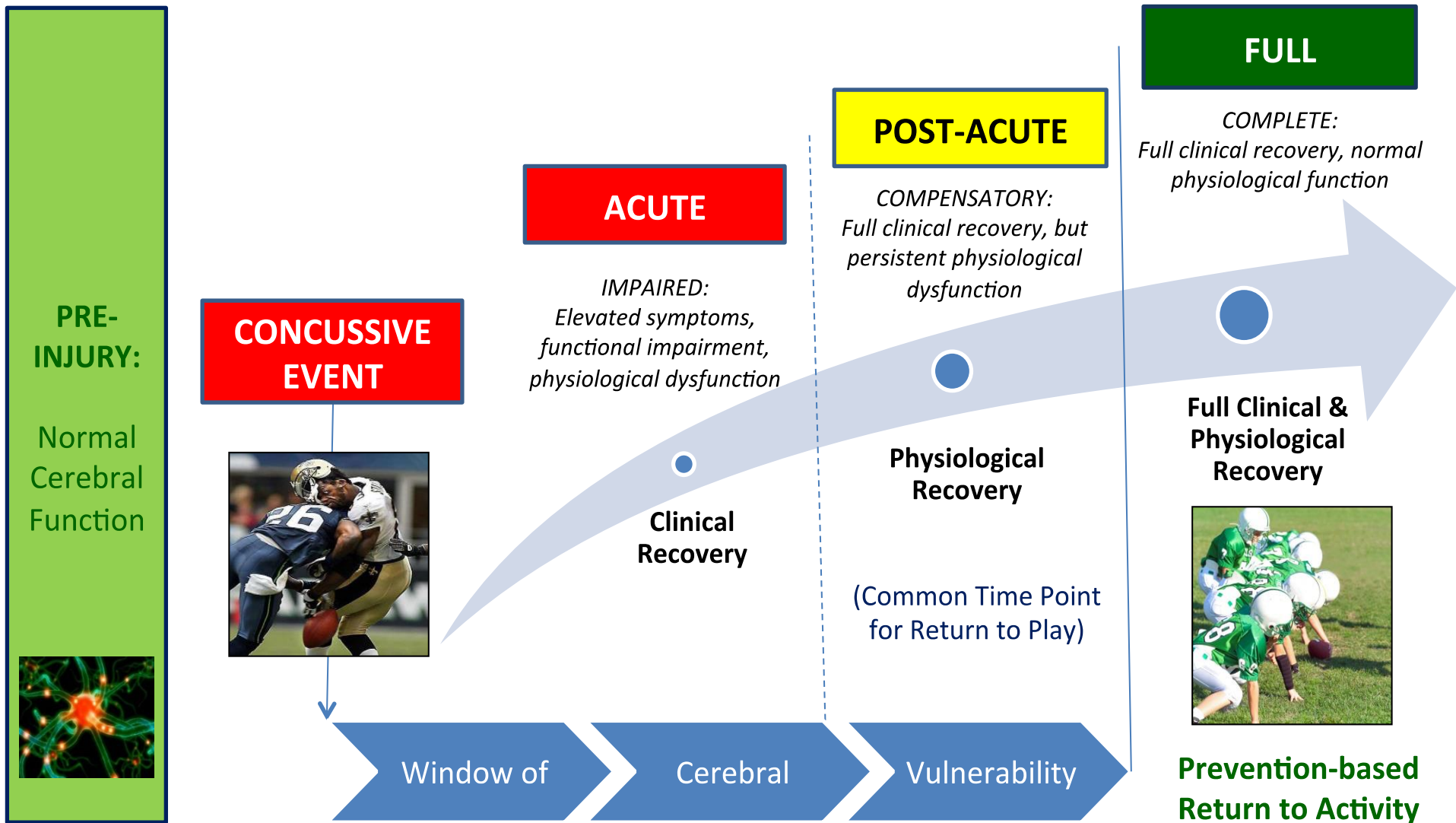
Consensus statement

Consensus statement on concussion in sport—the 5th international conference on concussion in sport held in Berlin, October 2016 **FREE**

Paul McCrory¹, Willem Meeuwisse², Jiri Dvorak^{3,4}, Mark Aubry⁵, Julian Bailes⁶, Steven Broglio⁷, Robert C Cantu⁸, David Cassidy⁹, Ruben J Echemendia^{10,11}, Rudy J Castellani¹², Gavin A Davis^{13,14}, Richard Ellenbogen¹⁵, Carolyn Emery¹⁶, Lars Engebretsen¹⁷, Nina Feddermann-Demont^{18,19}, Christopher C Giza^{20,21}, Kevin M Guskiewicz²², Stanley Herring²³, Grant L Iverson²⁴, Karen M Johnston²⁵, James Kissick²⁶, Jeffrey Kutcher²⁷, John J Leddy²⁸, David Maddocks²⁹, Michael Makdissi^{30,31}, Geoff Manley³², Michael McCrea³³, William P Meehan^{34,35}, Sinji Nagahiro³⁶, Jon Patricios^{37,38}, Margot Putukian³⁹, Kathryn J Schneider⁴⁰, Allen Sills^{41,42}, Charles H Tator^{43,44}, Michael Turner⁴⁵, Pieter E Vos⁴⁶



Integrated Recovery Model



Science Driving Evidence-based Management

Then vs. Now...

When comparing data in 2014 to data collected between 1999-2004 (Pfaller, 2016)

- >99% of athletes managed with a symptom free waiting period prior to return to sport (vs 60%).
- Symptom free waiting period now longer (6 vs. 3 days)
- Time from injury to return to sport is longer (12 vs. 7 days)
 - ***Important:*** Suggests most athletes not being returned inside the window of cerebral vulnerability.

Average Recovery Times

In a recent study of 143 High School & College Athletes (Pfaller, 2016):

- 72% have symptom recovery in 7 days
- 93.7% in 2 weeks
- 99% in 1-month



What We Think We Know:

We have good tools for assessing concussion.

Athletes are safer when taught the proper techniques and fundamentals of their respective sports at the appropriate age.

When coaches, parents and youth athletes are taught effective concussion recognition and response, athletes are safer.

What We Think We Know (*con't*):

Rule enforcement of unsafe player behavior that puts the head at risk for injury must be put into action.

There is no consensus by medical experts for a specific age at which kids are safer to begin playing contact sports.

Active management is better than strict rest after concussion.

There are fewer athletes with repeat concussions and fewer with same day return to play.

What We *Don't* Know:

Concussion thresholds and why they vary from person to person.

If playing contact sports for any number of years makes someone more susceptible to CTE.

Best interventions for treating concussion.

Where Do We Go From Here?:

Increased research emphasis on:

Education and training; teaching the fundamentals the right way

Improving concussion recognition and response (parents, coaches, players)

Reducing contact, but not eliminating it when it's part of the game.

Understanding long-term effects.

Where Do We Go From Here? (con't):

Utilize instructional tools such as USA Football's *Heads Up Tackling*.

Identify predispositions to concussion.

- Track head impacts to identify high risk behaviors, enforce rules, and modify behavior to protect the head.

Follow the science so that recommendations can be evidence-based.

Where Do We Go From Here? (con't):

Healthcare professionals / medical providers should have unchallengeable authority in medical/health decision-making.



Thank You & Questions



Johna K. Register-Mihalik, PhD, LAT, ATC
johnakay@email.unc.edu |  johnamihalik

